

AMSAT

SATELLITE REPORT



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Research Meshes With Member Mandate

AMSAT's long-range planning efforts historically have been difficult because the course of the organization has always been closely coupled with the availability of a "ride" to orbit. The program depends, with awesome finality, on serendipity: hitching a ride going the "right" way. But while this obstacle to long-range planning will likely be with us for some time, two recent events may alter other facets of the planning process significantly.

Both events occurred at year's end and, though placed before the amateur media, were less than fully appreciated. Yet the way in which these two events will affect our collective course likely will be seen years hence as profound.

The first event was the polling of all Life Members by President, W3IWI. Tom's questionnaire was returned by a remarkably high proportion of recipients (a singular accomplishment in its own right). The Life Members responding spoke quite strongly in favor of, in essence, progressive, innovative space programs which require AMSAT to maintain its de facto leadership of the Amateur Radio community. Moreover, the respondents expect the AMSAT leadership to not only foster innovation, but to make the ground fertile for it. They seem to be saying they depend on the leaders to employ their expertise in pursuit of advanced projects. For example, a large plurality saw an upward migration of satellite frequencies as both necessary and desirable. In all, the opinions expressed were remarkably current, cogent, thoughtful and supportive.

The second event was the appointment of Dr. Steve Robinson, W2FPY, as Director of Research and Development. Steve's marching orders were straightforward. As AMSAT's technology 'point' man, he is to reconnoiter technical progress and to help Engineering recognize and employ the latest of technology. Steve recruited Dr. Phil Karns, KA9Q and together they have already set out a pioneering course. For example, not only are they reporting on the state of the art, they are actually helping to advance it in meaningful ways. Although hundreds of satellites have flown, very little is known for sure about the affects of certain kinds of ionizing radiation on special classes of integrated circuits. This is critically im-

portant to AMSAT since Phase IIIB will be often exposed to lethal doses of radiation as it passes through the Van Allen belts. Radiation hardness design is a relatively new problem for AMSAT since all the Phase II satellites orbited at "safe" altitudes below the VA Belts. So Steve and Phil have set out to determine for AMSAT and, for all the world, what happens to these circuits in a special kind of particle flux (radiation). (Many tests have been done to learn the effects of nuclear explosions on ICs, but these tests are not directly applicable to the VA belt type flux.) Steve and Phil have arranged to perform the most realistic tests ever performed on the ICs using a 50MeV H⁺ beam at the Argonne National Accelerator Laboratory near Chicago. This intense particle beam will closely simulate the solar wind and thus the environment of the Phase III region of space.

Moreover, as if advancing the state of the art in this area were insufficient, Steve and Phil are lining up other experiments to broaden AMSAT's front line research.

How do these two events affect the long-range planning?

Taken together these two events can be viewed as first a mandate from the members to innovate and second as the means to implement that mandate. Talk of synchronicity!

In sum, a rare moment is upon us. One that will be, we conclude, seen in retrospect as pivotal. At the moment the technocrats among us are saying, in effect, "Look what lies ahead", the membership responds, "Well, get on with it!"

*50 million electron volt, neutral hydrogen.

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...and Counting

your overview of current happenings

Ariane Mystery Solved

European Space Agency (ESA) says it's found root cause of L02 failure which took AMSAT's Phase IIIA to submarine apogee. Subtle differences in machining Viking-V first stage engine injector nozzle set stage for disastrous combustion chamber oscillation. New specs and thorough pre-testing of nozzles will preclude recurrence of the problem, ESA said. Next launch, L03, is on for June, '81. AMSAT Phase IIIB is booked on L7 for 24 Feb. '82.

FCC Raises Power Limit On UHF

In deregulatory move FCC raised power limits on stations using 70 cm satellite uplinks. Moving on AMSAT's relief petition, power limits for 70 cm stations operating within 50 miles of key military QTHs were raised to 1 kW EIRP providing main lobe of pattern not less than 10° above horizon. No change for other 70 cm ops using 0° elevation. Move should help 70 cm satellite earth stations using high-altitude (Phase III & IV) birds which call for 500 to 1000 watts EIRP. FCC also added two sites to restricted list: Otis AFB (Cape Cod) and Beale AFB (Marysville, CA). Both are sites of new 400 MHz missile warning radars. (Pave Paws)

AO-8's Warm Tail Feathers

AO-8 showing effects of near continuous sunlight is warmer than any prior seasons. Several likely causes have been proffered for the baseplate and battery temperature rising to a high of about 44°C. Most important factor probably is sun angle which is gradually changing due to imperfect sun-synchronization. Additional factor likely is expansion of atmosphere due to active sun. Latter factor might also account for data suggesting "early" rise/set of AO-8. Increased particle density at orbital altitude slows AO-8 which decreases altitude (cf Mssr. Kepler). Resultant shorter period would appear as "early" rise/set. Difference from predicted time at mid-February thought to be less than a minute. No realistic explanation has been made to explain apparent reduction in spin rate of AO-8 over past two years from 0.2 RPM to present 0.06 RPM. Best suggestion seems to be atmospheric friction. No change in schedule of AO-8 is anticipated because of warm battery though bonus of dual mode A/J weekdays is likely. No evidence exists that battery life will be measureably shortened. Users may continue normal operations on AO-8 despite battery temp. If battery reaches 60°C, then corrective measures may be warranted.

Phase III Antenna Tests

Last minute changes in Phase IIIB antenna design will be avoided thanks to AMSAT DL team. Working with an expert at University of Berlin, AMSAT DL hopes to have Phase IIIB phased array antennas fully debugged and characterized soon. Object is to avoid last-minute surprises like those preceding Phase IIIA launch.

AMSAT Callsign Badge Campaign

AMSAT launched first in series of new campaigns to supplement major Phase III fund raising drives. Kickoff campaign features extraordinarily handsome callsign badges which proudly proclaims the wearer as an AMSAT supporter. Badges are awarded to members contributing \$5 or more to the program (Add \$1 for postage/handling). Write or call HQ for full info on how to get yours, today.

B.o.D. Eyes Awards/Contests

Spring meeting of AMSAT Board of Directors set for April 18/19. Agenda items include review of policy on awards and contests. Policy decisions may affect future activity on Phase II, III and IV satellites. Members invited to inform Directors of their thoughts on awards/contests and rationale supporting. Recommendations should be sent to HQ, Box 27.

AMSAT OSCAR 7 Changes

AO-7 to be in Mode 'C' on UTC Tuesdays for indeterminate period to see if the lighter load helps ungarble the beacon telemetry. Mode 'C' is low power version of 'B'. Also, AO-7 codestore load attempts over past weeks didn't work. Looks like ICs are permanently radiation-zapped after 6+ years in space. No further codestore load attempts are planned.

New/Interesting DX

(Heard recently): CN8BX; UC2ABN; UW4NI

(On soon): GM3RSR (Shetlands); W1BIH/PJ2 (Curacao).

AMSAT OSCAR 8 Anniversary

AO-8 is three years old March 5. ARRL will issue special QSL to commemorate event. Work through or monitor AO-8 1-7 March and send report to: ARRL, Club/Tng, AO-8 #3, Newington, CT, 06111.

Official AMSAT QSLs

The long-heralded Official AMSAT QSLs are now in development.

More on them next issue.

Ariane Launch Schedule

Vehicle	Year	Mission & Customer
L03	81	Apple(ISRO) + Meteosat(ESA)
L04	81	Marecs A (ESA)
L5	81	Marecs B(ESA) + Sirio(ESA)
L6	81	Exosat (ESA)
L7	82	ECS 1(ESA) + Phase IIIB(AMSAT) + Firewheel B(MPI)
L8	82	Intelsat F6
L9	82	Intelsat F7
L10	82	ECS 2 (ESA) + X
L11	82	Intelsat F8
—	83	TC1A (France)
—	83	TC1B (France)
—	83	TV SAT (Germany)
—	84	Spot (France)
—	84	TDF (France)
—	84	L-SAT (ESA)
—	84	Intelsat F13
—	85	OPMET (ESA) + X
—	85	Giotto (ESA)
—	85	ECS 3 (ESA) + X

X = Open

Radio Sputnik Lives?!

The excitement of early February now seems to have been unwarranted. To twist a Twain, "Reports of RS-1's resurrection are somewhat premature." A usually reliable source reported RS-type telemetry heard on two occasions 30 Jan.: 0100 and 2310 UTC. Seems little doubt telemetry was from RS-type device. But RS-1 back from the dead? Not likely say the experts. There are some curious facets of the observation that remain to be adequately explained such as the reception of a SSB PAØ station calling "CQ OSCAR" on 29.380 MHz. Reception of beacon was too short to detect any Doppler shift so it is not certain object was in orbit. Experts all but ruled out possibility mysterious signals originated with RS-1. RS-1 believed to have been killed (permanently) by radiation overdose associated with its high altitude which had it pass through lower regions of Van Allen radiation belts. Most likely, then, is test of RS-3 or another box from the usual Moscow site from which other tests heard in West originated. Two other possibilities exist though no one will take either too seriously (unless they prove to be right). Military communications satellite Molniya 1 was launched from Plesetsk 30 Jan. into a Phase III type orbit (40,801 x 464 km) inclined 62.8°. If an amateur package had been aboard, many reception reports could have been expected. Also, usual harbingers of impending RS launch were notably absent. Last possibility is suggested by W2FPY's recent work in developing Phase IIIB IHU memory. Dr. Robinson's research indicates that by use of special circuits and leaving the satellite dormant for some months, it may be possible to bleed off the accumulated charge on the ICs which result from ionizing radiation exposure. But since the techniques required to accomplish this reincarnation are only recently coming to be understood, they would have anticipated state of the art when RS-1 was being designed. So best current thinking is "Moscow Apartment" hypothesis. Stay tuned to 29.400 for further incarnations!!

AMSAT Spotlight On: W8DX



There are a few callsigns which are widely recognized on the OSCARs. Few, if any, calls are as well known as W8DX, Dick Cotton of Detroit. Among the many distinctions Dick has obtained is an uncanny ability to be the first satellite contact for a truly amazing number of amateurs. Among those whose first AO-6 contact was W8DX is practically every HQ AMSAT staffer!

In formal awards too, Dick has accumulated his share. He is especially proud of the OSCAR 6 W.A.S. trophy he won. In doing that he worked all 50 on OSCAR 6 and was only the fourth to accomplish that feat. One award that eludes Dick so far is Satellite DXCC, but he has rung up a very impressive 93 countries (92 confirmed) from Detroit to lead the region. If any new countries come on, Dick will likely be the first to know as his mental log can tell you what he needs for that last few.

Ham radio is in Dick's system for good it seems as he's been at it for 60 years, come April! Ever since OSCAR 6 was launched, however, he's spent most of his on-the-air time on the birds. In these nine years, using three OSCARs and two RSs, he's worked over 3500 different satellite stations, a third of them foreign! Now that's incredible.

In the 60 years since Dick first pounded out 9DPX from St. Paul, a lot of di-dahs have plied the ether. But never one to let moss grow, Dick is ready right now for Phase IIIB as a view towards the antenna farm will attest. Stowed there, ready for action at a moments notice, is a beautiful 70 cm helix and a two-meter crossed Yagi. And I suspect come Phase IIIB next year, the OM will show us upstarts a thing or two 'bout satellite DXin'. After all, anybody with a call like W8DX has a reputation to consider. 73 to one FB OM from ASR and AMSAT!



ON THE HORIZON

A Calendar Of Future Events Of Interest To The Satellite Community

March 1981

- 1-7: AO-8 3rd Anniv. Event
- 5: AO-8 3rd Anniv.
- 7: Project OSCAR Meeting, El Segundo, Cal.
- 14-15: ARRL National Convention, Orlando, Fla.
- 15: UoSAT: T = - 6 Months
- 24: Phase IIIB: T = -11 Months

April 1981

- 11-12: Phase III Command Mtg., GSFC
- 15: UoSAT: T = - 5 Months
- 18-19: Board of Directors Mtg., GSFC
- 24: Phase IIIB: T = - 10 Months
- 25-26: Dayton Hamvention

Details:

A meeting of the Project OSCAR group will be held on 7 March at 1300 PST at the Officers Club, Space Division, El Segundo, California. All are invited. Contact W6SP.

The ARRL National Convention will be held in Orlando, Florida, 14-15 March. AMSAT Florida Area Coordinator W4MID assisted by WD4FAB and WB4ZXS are arranging AMSAT booth and programs. HQ staff attending will be President W3IWI, Executive Vice President WA2LQQ, Vice President - Special Projects K9LF. W4MID is looking for additional help. Contact Jim on the Seasat Net: Sundays 0800 EST on 7280 kHz or by phone.

K9PVW is again coordinating arrangements for the Dayton Hamvention. AMSAT will as usual be strongly represented. More on this in a subsequent issue.

Help Wanted:

A software librarian to collect, maintain and catalog HP 41C s/w is sought. Location: anywhere. Contact AMSAT HQ (301) 589-6062.

Individuals needed with experience in wire wrapping boards for 40 man-hour task. Also individual needed to draw schematics and logic diagrams to professional standards from sketches. Location: Prefer N.Y. metro area. Contact: W2FPY, Dr. Steve Robinson, AMSAT Director R & D. Home: (201) 835-1152. Office: (914) 351-5277.

Editorial

Cohabitation.

Once again it seems that the number of terrestrial stations operating point to point in the vicinity of the 10 meter satellite downlink is on the rise. Two recent weekends have seen a variety of contests and with favorable band conditions on 10, the natural expansion from the congestion near 28.600 is upwards.

Many see the open expanse above 29.0 as the wide open spaces and begin to set up housekeeping right where they think they will be neither interfered with nor accused of interfering with others. Even though most are truly surprised to learn that they have alighted in the recognized satellite downlink passband, more often than not they gladly solicit and comply with guidance as to how to avoid further disruption to satellite operations. Rarely is an incorrigible encountered. But on that occasion when friendly persuasion seems ineffective, you must recall that no individual or group "owns" any portion of any band. It's as simple as that. It is in fact a gentlemen's agreement alone which provides for the partitioning of 10 meters. Your mission is to inform . . . not to enforce. Try to let the parties know that by international protocol the range 29.30 to 29.50 is set aside for satellite communications. Further, they might be surprised to know that even though they hear nothing on the band at that instant, there is a favorable chance that someone is trying to listen to satellite sub-horizon propagation or the like. Especially vulnerable is the 29.40 point as folks seem to like to congregate on "even" frequencies. The best any of us can hope to accomplish is to appeal to the cooperative nature most hams have. But be alert to your own attitude from the outset. If your approach is that of an irate landlord you can expect the door rudely shut on your nose! Thus your own tone may in large measure control your probability of success. And if you fail this time, you can always hope that your courtesy in explaining the situation will affect the individual later. Courtesy pays! In the long run AMSAT's best chance for avoiding the inevitable increase in congestion and mutual interference on the HF bands is the planned, orderly evolution to the vast untapped spectrum resources at UHF and above. For the present, friendly cohabitation is to be eagerly sought.—WA2LQQ